the analogy of these flints from the cement manufactory near Mantes with the so-called eoliths from Tertiary beds is substantiated, and he regards it as undeniable that these Mantes eoliths have been produced, and are being continually produced, apart from the intention of any human being.

In conclusion, he directs attention to the importance of migration both in history and in the development of all fossil groups. Nothing, he says, proves that the evolution of the human species or genus took place in one particular spot. It is very possible that man appeared suddenly in this part of the world at the beginning of the Quaternary period, at the same time as the mammalian fauna of which he forms part, and which is very different from the last fauna of Pliocene times. As a palæontologist, he believes firmly in the existence of Tertiary man, traces of whom, he doubts not, will eventually be found in some part of the world; but for these to be indisputable, they must possess a very different value from that of the eoliths.

In addition to M. Boule's memoir, an important article has appeared in the *Archiv für Anthropologie* (Neue Folge, vol. iv., p. 75), "Zur Eolithenfrage." It is from the pen of Dr. Hugo Obermaier, of Paris, who has also visited the cement works near Mantes, and entertains views upon the subject almost identical with those of M. Boule. He begins with a historical sketch of the discoveries of eoliths in beds from the Oligocene downwards to the Quaternary, and then proceeds to describe and discuss the modern products of the *délayeurs*, of one of which he gives a section. The paper is illustrated by eight plates, six of which are photographic. The first gives eight specimens of reputed eoliths from Miocene beds at Duan, near Brou (Eure et Loire). The other five are devoted to examples from Mantes, not a few of which present the "hollow-scraper" notches so often seen on eoliths. The remaining two plates contain reproductions of wood-cut figures of eoliths from various localities, so as to afford means of comparison between the old and the new.

He directs attention to an admission of M. Rutot that the eolithic industry is confined to localities where two conditions exist, the one that there was an abundance of the raw material flint, and the other that there was a stream of water in the neighbourhood, conditions which, in a modified form, exist at Mantes.

Want of space precludes a longer notice of this interesting article. We may, however, quote Dr. Obermaier's words in a letter to the editor of the *Archiv für Anthropologie* (Neue Folge Corr. Blatt., July, 1905, p. 50):—"We have now an experimental proof that eoliths can be formed in a purely mechanical manner."

NOTES.

As already announced, the inaugural meeting of the British Science Guild will be held on Monday next, October 30, at the Mansion House, at 4.15 p.m. The Lord Mayor will preside, and will be supported, among others, by the Lord Bishop of Ripon, Lord Strathcona and Mount Royal, the Right Hon. R. B. Haldane, K.C., M.P., Admiral Sir Cyprian Bridge, G.C.B., General Sir Frederick Maurice, K.C.B., Sir John Wolfe-Barry, K.C.B., F.R.S., Sir William Ramsay, K.C.B., F.R.S., Mr. C. W. Macara, and Sir Norman Lockyer, K.C.B., F.R.S.

A MEETING of the general committee of the British Association will be held in the rooms of the Linnean Society, Burlington House, on Tuesday next, October 31, at 3 p.m., for the purpose of appointing officers for the meeting of the association to be held at York next year, and of deciding upon the place of meeting in 1907.

THE Paris correspondent of the *Times* states that M. Gérault-Richard proposes to ask the French Parliament to vote a credit of 100,000 francs (4000*l.*) for the investigation of the best means of combating tuberculosis. The Minister of Education, M. Bienvenu-Martin, has promised the support of the Government.

THE death is announced of Prof. DeWitt Bristol Brace, head of the department of physics in the University of Nebraska, and one of the leading physicists of the United States. He was in his forty-seventh year, and had just entered upon his nineteenth year of teaching in the University of Nebraska.

AN international exhibition in connection with ceramic industries, and with the manufacture of glass and crystal, will be held in 1906 from June to October at the Champs-Elysées and the Cours-la-Reine. Full information can be obtained from the director-general of the exhibition, 19 rue Saint-Roch, Paris.

WE learn from the *Pharmaceutical Journal* that the Heriot trust governors have decided to establish a laboratory at the Heriot Watt College, Edinburgh, for the study of bacteriology in its relation to various industries. The laboratory has been fitted with the best appliances, and the services of Dr. Westergaard have been retained to supervise it. The laboratory was formally opened by a lecture by Prof. Hansen on October 18.

A STRONG earthquake shock was felt in Constantinople on October 22 at 5.55 a.m. The disturbances, which lasted several seconds, appeared to travel from the north-east towards the south-west, and were accompanied by a rumbling noise. Earthquake shocks were felt at 2 p.m. on the same day at Batum, and between 2 p.m. and 5 p.m. at Kutais. An undulating tremor lasting forty seconds was also experienced at Sukhum-Kaleh.

A CONFERENCE of delegates from the corresponding societies affiliated to the British Association will be held in the rooms of the Linnean Society on Monday and Tuesday, October 30 and 31, under the presidency of Dr. A. Smith Woodward, F.R.S. Among the subjects to be discussed are "The Preservation of Native Plants," to be introduced by Prof. G. S. Boulger, and "The Law of Treasure Trove," which will be introduced by Dr. W. Martin. The delegates will visit the museum of the Royal College of Surgeons, and will dine on Monday evening as guests of the Royal Societies Club.

A REUTER message states that the Berlin Meteorological Observatory, which the Emperor recently opened in the presence of the Prince of Monaco, is fitted with all the latest appliances for meteorological research. The Emperor attaches great importance to the use of balloons in meteorology, so that an extensive balloon hall has been included in the building plan of the new observatory at Lindenberg, near Berlin. On the highest point of the plateau on which the observatory stands is a shed which can be turned to any point of the compass, and contains a cable drum driven by a small electric motor for hauling in kites, which are to be extensively used for meteorological purposes. Electric search-lights have also been installed for night observation. Another interesting feature of the new institute is the kite factory, where large kites, fitted with self-registering instruments, are made. The institute has its own establishment where balloons can be filled, and it is the present intention of the directors to make observations with balloons every first Thursday in the month.

DR. BÁTHORI ENDRE, writing from Királyfalva, Hungary, informs us that the Bólyai international prize will be presented next December, for the first time, by the Hungarian Academy of Sciences. The prize is ten thousand crowns, and will be awarded every five years, in memory of John Bólyai, the celebrated Hungarian mathematician, to the writer of the best mathematical work in the same period of years. The committee concerned with the award of the prize met on October 11 in Budapest. The members of the committee are:—Prof. G. Darboux, Paris; Prof. F. Klein, Göttingen; Prof. G. König, Budapest; and Prof. G. Rados, Budapest. The names of two mathematicians were considered, viz. Prof. H. Poincaré and Prof. D. Hilbert. The committee awarded the prize to Poincaré, and at the same time expressed its acknowledgment and admiration of Prof. Hilbert's works. Profs. Darboux and Klein gave lectures in Budapest on the teaching of mathematics.

THE inaugural address of the Manchester Literary and Philosophical Society was delivered, on October 17, by Sir William H. Bailey, the president of the society. The address took the form of an interesting historical account of the society since its foundation in 1781, and included appreciative references to the work of many distinguished members whose names are to be found in early volumes of memoirs. The founders were the chief scientific men of Manchester. Among the honorary members were Erasmus Darwin, Dr. Franklin, Lavoisier, Dr. Priestley, William Roscoe, of Liverpool, the poet and grandfather of Sir Henry Roscoe, Dorning Ramsbottom, Josiah Wedgwood, and others. The chief tools of the workshops of the world, not only those where steam engines, locomotives, and steamships are built, but also of the textile factories of the world, were invented in Manchester or within thirty miles of it. The records of the society contain the names of many of these inventors who were members, for the men of Lancashire were the first to use steam power for spinning and weaving, and for punching, cutting, and shaping metal. Prominent among the inventors was that genius Richard Roberts, who was always in the front rank in advocating technical education. His chief inventions were the slide lathe, planing machine, and self-acting mule for spinning cotton. Then there was Nasmyth, the inventor of the steam-hammer, Sir William Fairbairn and Sir Joseph Whitworth. Finally, Sir William Bailey referred to the great work of the illustrious members Dr. Dalton and Dr. Joule, whose effigies in marble are in the entrance to the Manchester Town Hall.

PLANS have been formulated by Mr. Einar Mikkelsen, a young Dane, for an expedition to the Arctic regions, the objective being that part of the Polar Ocean which lies immediately to the west of the Parry Archipelago, north of Canada. Interviewed by a representative of the *Morning Post,* Mr. Mikkelsen gave an outline of his programme. He will be joined by Mr. Leffingwell, a young American geologist, and Mr. Ditlevsen, a naturalist, who, like Mr. Mikkelsen, accompanied Lieut. Amdrup to the east Greenland coast in 1900. It is proposed to start from Canada in the spring of 1906. Early in May the party hopes to reach the upper waters of the Athabasca River, by way of Edmonton, and to follow that stream, and the Slave and Mackenzie Rivers, down to the northern coast of the Dominion. It will be some time in July before the mouth of the Mackenzie River is reached. At the end of August a whaler, which will have been brought north especially for the use of the expedition, will be joined by the party. Geological and zoological investigations and study of the native Eskimo will occupy the time of waiting. At Cape Kellet it is hoped that winter quarters will be established. The winter is to be occupied with scientific investigations. The plan is that about the end of February the party, three white men, two Eskimo, and the dogs, shall start out from Prince Albert Cape in a N.N.W. direction, that is, more or less parallel to the mainland. Ten days, it is calculated, should see an end of the bad ice, and then Mr. Ditlevsen is to return, leaving Messrs. Mikkelsen and Leffingwell to continue the journey alone. They hope to keep on in the same direction as far as latitude 76° N., in about 147° west longitude, before turning south to reach the coast.

THE Tottenham Urban District Council has issued a public appeal for subscriptions for the purpose of furnishing a museum and for the donation of objects of interest. An opportunity occurred during the present year for securing a collection of minerals and other geological specimens for a nominal sum, and at the same time an offer was received from Mr. H. E. H. Smedley to lend his museum collection to Tottenham and to give his services as honorary curator. The council has accepted the offers. The cost of furnishing the museum is estimated at 250*l.* Any contributions in money, or suitable objects for exhibition, may be sent to the librarian at the Central Public Library, High Road, Tottenham.

THE increased sale of synthetic indigo promises, a writer in the *Journal of the Society of Arts* states, to destroy the old and important Anglo-Indian industry of indigo planting. Since 1895–6 the value of the exports has fallen from 3,569,700*l.* to 556,400*l.*, and this is largely due to synthetic indigo. Of the indigo imports of Japan last year fully three-fourths was the artificial product, vegetable indigo being increasingly unsalable. In the United States the synthetic dye came on the market in 1898, and was held at 44 cents per pound, about the value of vegetable indigo on the indigotin basis. Now the price is down to 18 cents, and at this figure it is claimed to be much cheaper than the lowest obtainable values in any vegetable indigo. The artificial dye has already secured nearly 85 per cent. of the world's consumption, and the price of indigo has dropped about one-half. To-day Germany imports only small quantities of natural indigo, while her exports of synthetic indigo have increased enormously, and represented last year a value of 25,000,000 marks.

THE study of the zoology of the Philippines is being energetically carried on by the Americans, one of the latest contributions being the description of new Hymenoptera, by Mr. W. H. Ashmead, published in the *Proceedings of the U.S. Nat. Museum* (No. 1416).

THE Agricultural Society of Sapporo, Japan, is devoting its energies to the study of the insects of the country and the mischief they inflict on agriculture, forestry, &c. In the first and second parts of the second volume (the first volume being at present apparently unpublished) of the society's journal, of which we have been favoured with copies, all the papers except one are, for instance, devoted to insects and their life-history. The groups discussed include the Cercopidæ, or lantern-flies, the fresh-water Hemiptera, and the bark-boring beetles of the family Scolytidæ. In the article referred to above, Mr. S. Hashimoto takes into consideration the composition of certain abnormal samples of milk.

THE papers in the *Zeitschrift für wissenschaftliche Zoologie* (vol. lxxx., part i.) include one by Mr. V. Widakowich on the structure and function of the so-called nidamental organs (that is to say, the glands which secrete the white and shell of the eggs) of the shark *Scyllium canicula.* In a second Mr. A. Reichensperger describes the anatomy of the living West Indian crinoid *Pentacrinus decorus.* A third, by Mr. O. C. Glaser, is devoted to certain features in the physiology of the American gastropod *Fasciolaria tulipa,* while in a fourth Messrs. Marshall and Dernehl commence a dissertation on the embryology and anatomy of the hymenopterous insect *Polistes pallipes.*

To the first part of the eightieth volume of the *Zeitschrift für wissenschaftliche Zoologie* Dr. O. Grosser communicates an interesting paper on the evidence that certain dermal structures or markings among vertebrates have a segmental origin. Among the features referred to are the transverse arrangement of the scaling on the under surface and sides of the body in lizards, and the transverse colour-bands on the bodies of the banded mongoose (*Crossarchus fasciatus*), the tiger, and the zebras. In regard to the scaling of reptiles, the author admits that the transverse arrangement is very probably a secondary feature due to adaptation to the movements of the body, while he adds that the evidence for the segmental origin of the transverse stripes in mammals is purely of a negative nature, and requires something much more definite in its favour before it can be accepted. It may be added that if this segmental origin of colour stripes be accepted, it at once cuts away the ground from those who regard it as a special protective adaptation.

WE have received the first part of a work, to be completed in six parts, price sixpence each, entitled "I go a-walking through the Country Lanes." No author's name appears on the title-page, but the text is stated to be compiled from the Rev. C. Johns's "British Birds and their Haunts." Each part is to contain reproductions from photographs taken by Mr. Reid, of Wishaw, the incomparable excellence of which needs no commendation on our part. The aim of the book is "to outline a walk in the country, and to describe and picture the habits of the birds and the animals that are to be seen." The photographs in some instances might have been made to convey more information. On p. 13 we have, for instance, a charming picture of a flock of sheep coming out of a field, to which the legend "changing pastures" is subscribed. It would surely have been just as easy to mention that these sheep, as shown by their white faces and long wool, are Leicesters, or some nearly kindred breed.

THE Selborne Society has issued an illustrated circular in which attention is directed to the objects coming within the purview of that body, and the privileges enjoyed by members. "Birds in the Field and Garden" is the title of an article in the October issue of *Nature Notes,* the official organ of the society, in which the nameless author, while admitting that a certain amount of damage is inflicted on fruit and other produce, maintains that, on the whole, the visits of birds are advantageous alike to the gardener, the fruit-grower, and the farmer. In connection with this subject, it may be mentioned that we are acquainted with certain gardens where, owing to the damage done to the buds by bullfinches and other members of the finch tribe, the whole of the gooseberry and currant bushes have been enclosed in wire netting with a mesh small enough to prevent the entrance of birds. The experiment has been carried on for two seasons with the most satisfactory results, and there has been no necessity to take any special steps to free the bushes from insects. Here, then, is a problem for those who urge that birds are essential to the gardener.

IN *Biologisches Centralblatt* for October 1 Mr. W. M. Wheeler, of the American Museum of Natural History, and Father E. Wasmann discuss the discovery of "temporary social parasitism" among ants, and the inductions to be drawn therefrom as to the origin of "slavery" among certain members of the group. Mr. Wheeler claims to have been the first to describe this temporary parasitism in a *Bulletin of the U.S. National Museum* issued in October, 1904; but the corollaries from this discovery and inferences in regard to the general origin of slavery among ants were not published by him until the middle of February of this year. In conclusion, the writer urges that none of the observations published by Father Wasmann during all the years he has been engaged in the study of ants "are sufficient to accredit him with the independent discovery of temporary social parasitism as a general and regular phenomenon among certain Formicidæ." In a reply to this article, Father Wasmann very candidly admits that Mr. Wheeler is fully entitled to the credit of this discovery, although he apparently does not accept certain other claims made by the American naturalist

"CAN fish hear?" is a question discussed by Dr. O. Körner in a special issue of the *Beiträge zur Ohrenheilkunde,* published to commemorate the seventieth birthday of Prof. A. Lucae. The question is provisionally answered in the negative, and for the following reasons. It seems that many fishes are able to perceive rapid, consecutive vibrations communicated to water, but that such vibrations are taken cognisance of by means of the so-called auditory organs is highly improbable. This is supported by the fact that single loud explosions in water were totally disregarded by fishes belonging to no less than five and twenty distinct species of fishes. Moreover, the circumstance that the presence of the senses of sight and touch is easily demonstrable in fishes renders it probable that the same would be the case with hearing if it existed. Finally, the fact that fishes, and apparently also such isolated forms in other groups as are deaf, alone among vertebrates possess no organs comparable to the Cortischian nerve-terminations renders it probable that these organs are alone capable of transmitting auditory vibrations, the hypothesis that such vibrations may be received by the vestibular apparatus not being at present substantiated.

WE have received part ii. of an illustrated catalogue of the ethnographical collection of the Sarawak Museum (Journal No. 43, April, Straits Branch, Royal Asiatic Society), by Mr. R. Shelford. This section deals only with the objects worn for decorative purposes by the natives of Borneo. The question of the relationship between magic and personal ornamentation has not been lost sight of, but many inquiries have elicited little information of importance. Kalabit youths when visiting new districts wear a necklace of decorative seeds as a charm against evil spirits, and Land-Dyak men wear a necklet of beads and canines of leopard and bear for a similar purpose; the beads are frequently regarded as charms against specific diseases. The leglets of finely plaited fibre so commonly worn were at one time employed as currency; the Kayans say they feel quite naked if they do not wear these leglets. The catalogue is very well done, and is illustrated by adequate plates. If the whole museum is treated in this way the catalogue will prove to be a very valuable record of the ethnography of Sarawak.

The *Bulletin du Jardin impérial botanique de St. Petersbourg,* vol. v., part iii., contains a description of new lichens from Central Russia and Siberia, by Mr. A. Elenkin, and an account of the vegetation on the chalk cliffs in the basin of the river Choper, by Mr. W. Dubjansky.

In his report for 1904–5, the curator of the botanic station in Dominica states that spineless lime plants are in great demand, but that he is unable to furnish an adequate supply, as the fruits contain very few seeds; also, owing to the labour involved, the supply of budded orange stock is limited. Other plants in request are cacao, rubber —both Castilloa and Funtumia—and ordinary limes. Judging from the manurial experiments with cacao, extending over three years, the application of phosphate and potash with dried blood may be expected to give substantial increases in yield, while mulching with grass has produced even better results.

The Department of Agriculture for British East Africa has issued a leaflet on the cultivation and commercial products of the cocoanut. The industry is one that requires some capital, as the plants only come into bearing in the sixth year, and meantime the cultivator is dependent upon the maize, ground-nuts, or any other crop that he may grow between the trees. The most lucrative product in East Africa is *tembo,* a liquor obtained from the cut end of the very young flowering spike. The Department of Forestry in the same colony has also inaugurated a series of leaflets, the first of which deals with timber trees, including a juniper, a Podocarpus, *Pygeum africanum,* and *Allophylus abyssinicus.*

We have received a pamphlet entitled "The Growth of Oak in High Forest," by Prof. W. R. Fisher, president of the Royal English Arboricultural Society, in which the author points out the desirability of having a model oak high forest as an adjunct to the forestry school at Oxford. In spite of the fact that oak forests and oak timber have played such an important part in the history of England, we have not at the present day a typical example of oak high wood, that is, an area where all stages from the seedling to the mature tree are represented. In the above pamphlet Prof. Fisher proposes to have a working section of the oak wood in Windsor Park set aside for this purpose. The area required, 1200 acres, could surely be spared for this important purpose, and the author clearly shows how the present crop could with time be replaced by a series of age classes representing all stages in the growth of the tree and the forest from the beginning to the end of the rotation. The financial returns would be vastly increased thereby, more than counterbalancing and justifying any small initial sacrifice. The scheme deserves every encouragement, and we trust will be looked upon with favour by those in authority.

One of the best concise accounts of the Liége International Exhibition yet published is contributed by Mr. L. Ramakers to the October issue of the *Engineering Magazine.* Some excellent illustrations are given of the mechanical, mining, and metallurgical features. Several large engines for operation with blast-furnace waste gas were shown, notably a 1200 horse-power four-cycle double-acting horizontal tandem engine for the direct driving of a rolling mill at the Cockerill works. Another gas engine shown by the same firm is a 500 horse-power four-cycle double-acting twin cylinder for operation with coke-oven waste gas. A gas-producer of novel type was exhibited by the Deutz Gas Engine Works, the fuel for which consists of brown-coal briquettes. The same firm showed an eight horse-power locomotive with a benzene motor.

From the Rationalist Press Association there come cheap reprints of "The Fundamental Principles of the Positive Philosophy" and of Haeckel's "The Wonders of Life." The former book contains a translation of the two introductory chapters of Comte's "Philosophie Positive," that is, the account of Comte's main theses, of the law of the three states of knowledge and the nature of positive philosophy, together with the fulminations against introspective psychology which are now completely out of date. Haeckel's work is a supplement to the "Riddle of the Universe," and discusses life, death, morality, and many other things.

OUR ASTRONOMICAL COLUMN.

The Recent Large Sun-spot.—The accompanying reproduction shows the form and extent of the large sun-spot group referred to in these columns last week. This photograph was taken at 12 o'clock noon on Thursday last, October 19, when the group was plainly visible to the naked eye. A rough measurement shows that the group was then more than 100,000 miles long and about 55,000 miles across its greatest breadth. The smaller spot, seen in the N.W. quadrant, was of particular beauty, showing a very dark circular umbra surrounded by a symmetrical penumbra.

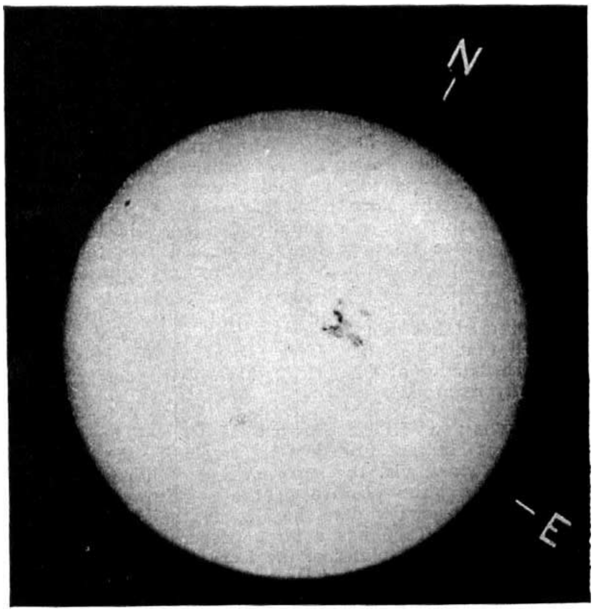

Fig. 1.—Photograph of the Sun showing the large group of sun-spots October 19, 12 o'clock noon.

A second "naked-eye" spot having a large black nucleus was seen near to the eastern limb of the sun on Monday last. This is the second occasion during the present year that the sun has presented the unusual phenomenon of two naked-eye spots visible on the disc at the same time.

Further Results of the French Eclipse Expeditions.—Yet another batch of the preliminary results obtained by French expeditions during the recent total eclipse of the sun is published in No. 15 of the *Comptes rendus.*

Prof. Janssen, who was in charge of the expedition stationed at Alcosebre (Spain), describes the observations which were made and the instruments which were employed at that station, and separate reports are pre-